

United States Department of Agriculture Natural Resources Conservation Service

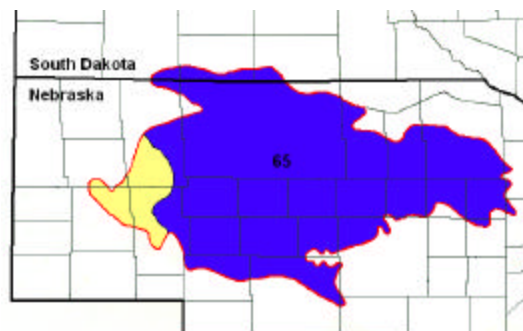
Ecological Site Description

Site Type: Rangeland

Site Name: Shallow to Gravel 17-25" P.Z.

Site ID: R065XY041NE

Major Land Resource Area:
65 – Nebraska Sand Hills



Physiographic Features

This site occurs on stream terraces and uplands where gravelly sediments are deposited. This site is generally limited to the transitional areas on the edge of MLRA 65, and is most frequent on upland sites along rivers and streams. Although rarely occurring when compared to other sites, it's less resilient nature, droughty conditions and special management concerns require a separate site description.

Landform: Ridge, terrace, and alluvial fan

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2000	4000
Slope (percent):	0	30
Water Table Depth (inches):	None	None
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Slow	Rapid

Climatic Features

The mean average annual precipitation varies from 17 - 25 inches, but has varied from 13 to 29 inches in the driest to wettest seasons. Approximately 65 percent of the annual precipitation occurs during the growing season of mid-April to late September. The average annual snowfall varies from about 30 inches to about 55 inches. The wind velocity is high throughout the year, averaging 10 to 12 miles per hour. Maximum wind velocities generally occur in the spring.

The average length of the growing season is 138 days, but the growing season has varied from 114 to 168 days. The average date of first frost in the fall is September 25, and the last frost in the spring is about May 10. July is the hottest month and January is the coldest. It is not uncommon for the temperature to reach 100 °F during the summer. The winters are characterized with frequent northerly winds, producing severe cold with temperatures dropping to as low as -30 °F.

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Growth of native cool season plants begins mid to late March and continues to late June. Native warm season plants begin growth in early May and continue to late August. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	131	145
Freeze-free period (days):	150	165
Mean Annual Precipitation (inches):	17	25

Average Monthly Precipitation (inches) and Temperature (°F):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.31	0.51	8.0	37.8
February	0.44	0.66	12.7	43.7
March	0.75	1.54	21.3	50.0
April	1.85	2.31	31.4	62.1
May	2.88	3.54	41.5	72.7
June	3.09	4.15	51.3	82.2
July	2.77	3.29	57.2	88.9
August	2.12	3.12	55.2	87.0
September	1.56	2.37	44.7	77.7
October	1.16	1.61	32.7	66.6
November	0.44	0.94	20.5	49.6
December	0.31	0.61	11.4	40.3

Climate Stations		Period	
Station ID	Location or Name	From	To
NE1130	Brewster	1948	1997
NE2805	Ewing	1948	1997
NE2647	Ellsworth 15 NNE	1963	1997
NE6970	Purdum	1948	1997

For other climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

Influencing Water Features

Wetland Description:	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
None	None	None	None	None

Stream Type: None
(Rosgen System)

Representative Soil Features

The features common to all soils in this site are the sand to sandy loam textured surface soils and slopes of 0 to 30 percent. The soils in this site are from somewhat excessively to excessively drained and formed in alluvium. The surface layer is 4 to 16 inches thick. The texture of the subsurface generally ranges from sand to gravelly coarse sand. Runoff as evidenced by patterns of rill, gully or other water flow is negligible to low, in spite of the steep slopes, due to the very high intake rate of these soils. Cryptobiotic crusts are present, but their function is not well understood. Some pedestalling of plants occurs, but it is not very evident on casual observation and occurs on less than 5% of the plants.

More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

Major soil series correlated to this ecological site include: Meadin and Simeon.

Other soil series that have been correlated to this site include: None.

Parent Material Kind: alluvium
Parent Material Origin: mixed
Surface Texture: sand, loamy sand, sandy loam
Surface Texture Modifier: none
Subsurface Texture Group: sandy
Surface Fragments ≤ 3" (% Cover): 0-40
Surface Fragments > 3" (%Cover): 0-5
Subsurface Fragments ≤ 3" (% Volume): 0-55
Subsurface Fragments > 3" (% Volume): 0-10

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	excessively	excessively
Permeability Class:	rapid	very rapid
Depth (inches):	>80	>80
Electrical Conductivity (mmhos/cm):	0	0
Sodium Absorption Ratio:	0	0
Soil Reaction (1:1 Water):	5.1	7.8
Soil Reaction (0.1M CaCl₂):	NA	NA
Available Water Capacity (inches):	2	5
Calcium Carbonate Equivalent (percent):	0	0

Plant Communities

Ecological Dynamics of the Site:

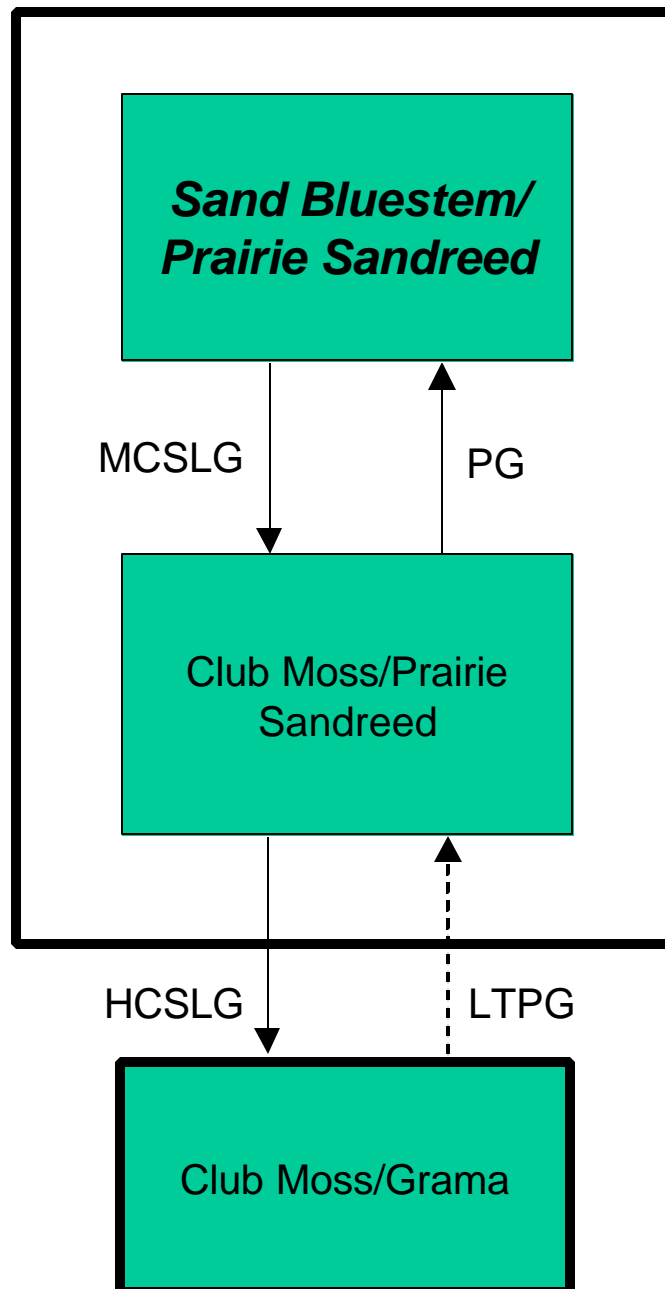
As this site deteriorates, species such as hairy grama, blue grama, and club moss will increase. Grasses such as sand bluestem, little bluestem, needleandthread and sideoats grama will decrease in frequency and production. Perennial forbs increase under poor management, and if management persists, annual forbs and shrubs will also increase as grasses decrease.

This site is extremely responsive to high moisture years when additional moisture is received during the growing season. The associated coarse textured soils have low moisture holding capability, which generally limits plant growth. With additional moisture, the interpretive plant community can significantly increase its production when compared to the production of a normal year.

Interpretations are primarily based on the Sand Bluestem/Prairie Sandreed Plant Community. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways (diagram)



HCSLG - heavy continuous season-long grazing

LTPG - long-term prescribed grazing

MCSLG - moderate continuous season long grazing

PG - prescribed grazing

Plant Community Composition and Group Annual Production

		Sand Bluestem/Prairie Sandreed			Club Moss/Prairie Sandreed			Club Moss/Grama		
COMMON/GROUP NAME	SYMBOL	Grp	lbs /acre	% Comp	Grp	lbs /acre	% Comp	Grp	lbs /acre	% Comp
GRASSES & GRASS-LIKES			700 - 800	70 - 80		630 - 720	70 - 80		225 - 400	45 - 80
WARM-SEASON GRASSES		1	250 - 500	25 - 50	1	270 - 540	30 - 60	1	25 - 75	5 - 15
sand bluestem	ANHA	1	150 - 300	15 - 30	1	45 - 135	5 - 15	1	0 - 25	0 - 5
prairie sandreed	CALO	1	50 - 200	5 - 20	1	225 - 405	25 - 45	1	25 - 50	5 - 10
little bluestem	SCSC	1	50 - 100	5 - 10	1	0 - 45	0 - 5			
GRAMA		2	50 - 200	5 - 20	2	90 - 270	10 - 30	2	175 - 250	35 - 50
blue grama	BOGR2	2	50 - 150	5 - 15	2	90 - 225	10 - 25	2	150 - 250	30 - 50
hairy grama	BOHI2	2	0 - 100	0 - 10	2	45 - 135	5 - 15	2	25 - 150	5 - 30
NEEDLEGRASS		3	50 - 150	5 - 15	3	0 - 45	0 - 5	3	0 - 25	0 - 5
needleandthread	HECOC8	3	50 - 150	5 - 15	3	0 - 45	0 - 5	3	0 - 25	0 - 5
porcupine grass	HESP11	3	0 - 50	0 - 5	3	0 - 45	0 - 5			
MISC. NATIVE GRASSES		4	50 - 150	5 - 15	4	45 - 180	5 - 20	4	25 - 100	5 - 20
prairie junegrass	KOMA	4	0 - 50	0 - 5	4	45 - 90	5 - 10	4	0 - 25	0 - 5
sand dropseed	SPCR	4	0 - 100	0 - 10	4	0 - 90	0 - 10	4	0 - 50	0 - 10
sideoats grama	BOCU	4	0 - 50	0 - 5	4	0 - 45	0 - 5	4	0 - 25	0 - 5
other perennial grasses	2GP	4	0 - 20	0 - 2	4	0 - 18	0 - 2	4	0 - 25	0 - 5
PERENNIAL GRASS-LIKES		5	0 - 50	0 - 5	5	0 - 90	0 - 10	5	0 - 25	0 - 5
sedge	CAREX	5	0 - 50	0 - 5	5	0 - 90	0 - 10	5	0 - 25	0 - 5
FORBS		6	10 - 50	1 - 5	6	9 - 45	1 - 5	6	5 - 50	1 - 10
stiff sunflower	HEPA19	6	0 - 10	0 - 1	6	0 - 9	0 - 1			
western ragweed	AMPS	6	0 - 20	0 - 2	6	0 - 9	0 - 1	6	0 - 25	0 - 5
cutleaf ironplant	MAPI	6	0 - 10	0 - 1	6	0 - 18	0 - 2	6	0 - 10	0 - 2
green sagewort	ARDR4							6	0 - 10	0 - 2
goldenrod	SOLID	6	0 - 20	0 - 2	6	0 - 18	0 - 2	6	0 - 10	0 - 2
other perennial forbs	2FP	6	0 - 20	0 - 2	6	0 - 18	0 - 2	6	0 - 10	0 - 2
SHRUBS		7	50 - 150	5 - 15	7	45 - 135	5 - 15	7	25 - 75	5 - 15
brittle cactus	OPFR	7	0 - 50	0 - 5	7	0 - 45	0 - 5	7	0 - 25	0 - 5
broom snakeweed	GUSA2	7	0 - 50	0 - 5	7	0 - 45	0 - 5	7	0 - 25	0 - 5
plains pricklypear	OPPO	7	0 - 50	0 - 5	7	0 - 45	0 - 5	7	0 - 25	0 - 5
fringed sagewort	ARFR4	7	0 - 50	0 - 5	7	0 - 45	0 - 5	7	0 - 10	0 - 2
CRYPTOGAMS		8	0 - 100	0 - 10	8	45 - 135	5 - 15	8	75 - 150	15 - 30
clubmoss	SEDE2	8	0 - 100	0 - 10	8	45 - 135	5 - 15	8	75 - 150	15 - 30
Annual Production lbs /acre		LOW RV HIGH			LOW RV HIGH			LOW RV HIGH		
GRASSES & GRASS-LIKES		550 - 820 - 1185			515 - 693 - 770			310 - 310 - 310		
FORBS		5 - 30 - 55			5 - 27 - 50			0 - 28 - 55		
SHRUBS		45 - 100 - 155			40 - 90 - 140			20 - 50 - 80		
CRYPTOGAMS		0 - 50 - 105			40 - 90 - 140			70 - 113 - 155		
TOTAL		600 - 1000 - 1500			600 - 900 - 1100			400 - 500 - 600		

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Relative value.

Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and repeatable. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data are collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be considered "Desired Plant Communities". According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC's) will be determined by the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including these communities is to capture the current knowledge and experience at the time of this revision.

Sand Bluestem/Prairie Sandreed Plant Community

Interpretations are primarily based on the Sand Bluestem/Prairie Sandreed Plant Community (this is also considered climax). This plant community evolved with grazing by large herbivores and is moderately suited for grazing by domestic livestock. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 80% grasses or grass-like plants, 5% forbs, and 15% woody plants.

The major grasses include blue grama, sand bluestem, prairie sandreed, and needleandthread. Other grasses occurring on this plant community include sand dropseed, prairie junegrass, little bluestem and sideoats grama.

This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a healthy and sustainable plant community (site/soil stability, watershed function, and biologic integrity).

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: NE6534

Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands

Growth curve description: Warm-season dominant, cool-season subdominant, mid & tall grasses.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	5	15	25	30	10	7	3	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Moderate, continuous season-long grazing will convert the plant community to the *Club Moss/Prairie Sandreed Plant Community*.

Club Moss/Prairie Sandreed Plant Community

This plant community is found under summer long grazing with moderate grazing pressure, or as a transitional plant community in a rotational grazing system. While prairie sandreed is the dominant species, blue grama is a significant component of this plant community. Warm-season grasses make up the majority of the plants with the balance made up of perennial forbs, sedges and shrubs.

The potential vegetation is about 70% grasses or grass-like plants, 5% forbs, 15% shrubs and 10% cryptogams. Dominant grasses include blue grama and prairie sandreed. Grasses of secondary importance include little bluestem, prairie junegrass, and sand dropseed. Forbs commonly found in this plant community include cutleaf ironplant and goldenrod. The significant shrubs include fragile cactus, broom snakeweed, common pricklypear and fringed sagewort.

When compared to the interpretive plant community, prairie sandreed and club moss has increased. Little bluestem and needleandthread has decreased, and production of other cool and warm-season grasses has also been reduced. Sedges have also increased as a result of summer grazing pressure.

This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: NE6534

Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands

Growth curve description: Warm-season dominant, cool-season subdominant, mid & tall grasses.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	5	15	25	30	10	7	3	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Continuous season-long grazing combined with heavy stocking rates will convert the plant community to the *Club Moss/Grama Plant Community*.
- Prescribed grazing will convert this plant community to the *Sand Bluestem/Prairie Sandreed Plant Community*.

Club Moss/Grama Plant Community

This plant community is found close to watering facilities under continuous, summer long grazing with moderate grazing pressure, or pasture wide under heavy grazing use. Blue grama, hairy grama and club moss are significant components of this plant community. Warm-season grasses make up the majority of the plants with the balance made up of perennial forbs, sedges and shrubs.

The potential vegetation is about 55% grasses or grass-like plants, 10% forbs, 15% shrubs and 20% cryptogams. Dominant grasses include blue grama, hairy grama and prairie sandreed. Grasses of secondary importance include little bluestem, prairie junegrass, and sand dropseed. Forbs commonly found in this plant community include cutleaf ironplant and goldenrod. The significant shrubs include fragile cactus, broom snakeweed, common pricklypear and fringed sagewort.

When compared to the interpretive plant community, grama grasses and club moss has increased. Little bluestem and sand bluestem has decreased, and production of cool and warm-season grasses has also been reduced.

The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year:

Growth curve number: NE6535

Growth curve name: Nebraska/South Dakota Sandhills, Grama

Growth curve description: Warm-season dominant, short grass.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	15	30	25	15	10	0	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Long term prescribed grazing with adequate rest will convert this plant community to the *Club Moss/Prairie Sandreed Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Sand Bluestem/Prairie Sandreed Plant Community:

Club Moss/Prairie Sandreed Plant Community:

Club Moss/Grama Plant Community:

Animal Preferences (Quarterly – 1,2,3,4[†])

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
blue grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
brittle cactus	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
broom snakeweed	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	U U U U
clubmoss	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
cutleaf ironplant	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
hairy grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
plains pricklypear	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
sand bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
sand dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P U
stiff sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
western ragweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Production (lbs./acre)	Carrying Capacity* (AUM/acre)
Sand Bluestem/Prairie Sandreed	1000	0.32
Club Moss/Prairie Sandreed	900	0.28
Club Moss/Grama	500	0.16

* Continuous season-long grazing with proper livestock distribution under average growing conditions. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

Water is the principal factor limiting forage production on this site. Meadin and Simeon soils on this site are in Hydrologic Soil Group A. Water transmission through Group A soils is normally greater than 0.30 inches per hour. Runoff is expected to occur only during the most intense storms (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

The high infiltration rate of these sands results in few rills and gullies or water flow patterns even though steep slopes may be included. Pedestals are only slightly present in association with bunchgrasses such as needleandthread. Litter typically falls in place on flat slopes. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present but only cover 1-2% of the soil surface. This crusting is not significant for hydrologic considerations. Overall this site has the appearance of being stable and productive.

Recreational Uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

No appreciable wood products are present on the site.

Other Products

None noted.

Supporting Information

Associated Sites

- (065XY033NE) – Sands 17-22" P.Z.
- (065XY055NE) – Sands 22-25" P.Z.
- (065XY032NE) – Sandy 17-22" P.Z.
- (065XY054NE) – Sandy 22-25" P.Z.

Similar Sites

- (065XY032NE) – Sandy 17-22" P.Z.
[higher production; sand bluestem dominant; less blue grama]

Site Type: Rangeland
MLRA: 65 – Nebraska Sand Hills

Shallow to Gravel 17-25" P.Z.
R065XY041NE

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Those involved in developing this site include: Dave Cook, Rangeland Management Specialist, NRCS; Dwight Hale, Engineer, NRCS; Sheila Luoma, Resource Conservationist, NRCS; Marla Shelbourn, Rangeland Management Specialist, NRCS; Dave Steffen, Rangeland Management Specialist, NRCS.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417	3	1980 – 1999	NE	Cherry
Ocular estimates	0	19 -19	XX	county

State Correlation

This site has been correlated with South Dakota in MLRA 65.

Type Locality

State:	Township:	Latitude:
County:	Section:	Longitude:
General Legal Description:	Range:	Is the type locality sensitive? (Y/N):

Field Offices Counties

Ainsworth, NE	Brown, Keya Paha & Rock
Albion, NE	Boone
Broken Bow, NE	Custer
Burwell, NE	Garfield, Loup and Wheeler
Greeley, NE	Greeley
Martin, SD	Bennett & Shannon
Neligh, NE	Antelope
North Platte, NE	Lincoln, Logan & McPherson

Field Offices Counties

Ogallala, NE	Arthur & Keith
O'Neill, NE	Holt
Oshkosh, NE	Garden
Rushville, NE	Sheridan
Thedford, NE	Blaine, Grant, Hooker & Thomas
Valentine, NE	Cherry
White River, SD	Todd

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States; 44a – Nebraska Sand Hills.

Other References

Other sources used as references include: USDA NRCS Water & Climate Center, USDA NRCS National Range and Pasture Handbook, USDA NRCS Soil Surveys from various counties, Atlas of the Sandhills.

Site Description Approval

State Range Management Specialist

Date

State Range Management Specialist

Date